

for flexing the annular member (the elastic cylinder 21') wherein the flexing means (the motor output part 32'') is rotatable (in either direction of the double-headed arrow in Figure 9) about the longitudinal axis of the first annular member (the elastic cylinder 21') as indicated in lines 26-35 of column 4 of the specification of Richter. Thus Richter does not teach, suggest, or describe a flexing means for flexing a first annular member wherein the flexing means is nonrotatable about the longitudinal axis of the first annular member as required by claims 1-7, 13, and 14 of Applicant. The nonrotatable flexing means of Applicant avoids the expense, complication, and unreliability of having the rotating actuators of Richter with his bearing supports, rotating electrical parts, etc.

The examiner's rejection of claims 8-12 and 15-17 as being "obvious", under 35 U.S.C. 103, is respectively traversed. The examiner rejects these claims as being unpatentable over Richter in view of Kushida or Nishikura. Claims 8-12 depend directly or indirectly from claim 2. Claims 15-17 are independent claims.

The examiner alleges that Richter teaches the harmonic motor of claims 8-12 and 15-17 of Applicant (except for the transducer element being an array coupled to the inside of the flex-spline gear). Applicant respectfully disagrees. Claims 8-12 and 15-17 require the flexing means 16 for flexing the first annular member 12 to be nonrotatable about the longitudinal axis 18 of the first annular member 12. Richter discloses, in Figure 9, a flexing means (the motor output part 32'') for flexing the annular member (the elastic cylinder 21') wherein the flexing means (the motor output part 32'') is rotatable (in either direction of the double-headed arrow in Figure 9) about the longitudinal axis of the first annular member (the elastic cylinder 21') as indicated in lines 26-35 of column 4 of the specification of Richter. Thus Richter does not teach, suggest, or describe a flexing means for flexing a first annular member wherein the flexing means is nonrotatable about the longitudinal axis of the first annular member as required by claims 8-12 and 15-17 of Applicant. The nonrotatable flexing means of Applicant avoids the expense, complication, and unreliability of having the rotating actuators of Richter with his bearing supports, rotating electrical parts, etc.

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The examiner notes that Richter contemplates the use of various suitable transducer materials including electromagnetic and magnetostrictive. Applicant respectfully disagrees. These other materials are mentioned by Richter in the background of the invention in describing the prior art and not in describing his invention. Even if Richter contemplated the use of other materials, those other materials would be used in the same actuator design of Richter shown in Figure 9 and not used in the different flexing means designs recited in claims 8-12 and 15-17 of Applicant.

The examiner alleges that it would have been obvious to have driven the flexible spline gear of Richter with the transducer array of Kushida or Nishikura. The transducer arrays of Kushida and Nishikura are disposed but are not disposed on the inner circumference or inner perimeter of a flex-spline gear or a flexible member. More specifically, neither Kushida nor Nishikura taken alone or in combination teach, suggest, or describe a flexing means including an array of spaced-apart piezoelectric members or spaced-apart magneto-restrictive members or spaced-apart magnets disposed on the inner circumference or inner perimeter of the flex-spline gear or the first annular member as required by claims 8-12 and 15-17 of Applicant.

It is clear that the patents cited by the Examiner, taken alone or in combination, do not teach, suggest, or describe the subject matter of Applicants' claimed invention.

Inasmuch as each of the rejections has been answered by the above remarks, it is respectfully requested that the rejections be withdrawn, and that this application be passed to issue.

Please charge any necessary fees, including any extension of time, or any other fee deficiencies to Delphi Technologies, Inc., Deposit Account No. 50-0831.

Respectfully submitted,

  
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